

**WHAT IS CLAIMED IS:**

1. A method for grouping one or more interested objects in a directory system based on their corresponding accesses patterns with regard to other objects, the access pattern of an interested object being defined by other objects which the interested object has accessed or by which the interested object has been accessed, the method comprising:

putting each interested object in a singleton cluster, the singleton cluster having only one such object member; and

merging first and second singleton clusters into a third cluster if a ratio between an access pattern in terms of objects associated with each of the first and second singleton clusters and a combined access pattern associated with the third cluster (the "Access Ratio") conforms to a predetermined threshold,

wherein the step of merging is repeated until no more clusters can be merged.

2. The method of claim 1 further comprising modifying each cluster, after no more clusters can be merged, if at least one of its objects' access activities has changed the corresponding access pattern associated with the object such that the Access Ratio associated with the cluster does not conform to the predetermined threshold.

3. The method of claim 2 further comprising:

removing the object causing the non-conformance of the predetermined threshold from its cluster into a fourth singleton cluster; and

merging the singleton cluster with other clusters to form additional merged clusters if Access Ratios of the additional merged clusters conform to the predetermined threshold.

4. The method of claim 1 wherein the access pattern of the interested object is stored as a working set containing one or more other objects.

5. The method of claim 4 wherein the working set contains a predetermined number of other objects most recently accessed by or having accessed the interested object, which are not redundant among themselves.

6. The method of claim 1 further comprising determining an access list of each cluster after all the mergers have been done.

7. The method of claim 6 further comprising determining an association list of each cluster containing one or more clusters that share one or more objects therewith.

8. A method for guiding the placement and configuration of sparse replicas in a computer network, the computer network being operable with a directory system, the method comprising:

identifying a plurality of network addresses representing a plurality of computer sub-networks and identifying a plurality of directory user objects as active objects, each active object having an access pattern defined by one or more objects which have been accessed by the active object;

identifying a plurality of attributes or object classes as passive objects, each passive object having an access pattern defined by one or more objects that have accessed the passive object;

grouping one or more identified active objects and passive objects based on their corresponding access patterns; and

placing and configuring a sparse replica based on a result of the grouping.

9. The method of claim 8 wherein the step of grouping further comprises:  
putting each active and passive object in a singleton cluster, the singleton cluster  
having only one such object member; and

merging first and second singleton clusters into a third cluster if a ratio between  
the access pattern in terms of objects associated with each of the first and second  
singleton clusters and a combined access pattern associated with the third cluster (the  
"Access Ratio") conforms to a predetermined threshold,

wherein the step of merging is repeated until no more clusters can be merged.

10. Functional data for grouping one or more interested objects in a directory  
system based on their corresponding accesses patterns with regard to other objects, the  
access pattern of an interested object being defined by other objects which the interested  
object has accessed or by which the interested object has been accessed, the functional  
data comprising instructions for:

putting each interested object in a singleton cluster, the singleton cluster having  
only one such object member; and

merging first and second singleton clusters into a third cluster if a ratio between  
an access pattern in terms of objects associated with each of the first and second  
singleton clusters and a combined access pattern associated with the third cluster (the  
"Access Ratio") conforms to a predetermined threshold,

wherein the merging is repeated until no more clusters can be merged.

11. The functional data of claim 10 further comprising modifying each cluster,  
after no more clusters can be merged, if at least one of its objects' access activities has  
changed the corresponding access pattern associated with the object such that the  
Access Ratio associated with the cluster does not conform to the predetermined  
threshold.

12. The functional data of claim 11 further comprising instructions for:  
removing the object causing the non-conformance of the predetermined  
threshold from its cluster into a fourth singleton cluster; and

merging the fourth singleton cluster with other clusters to form additional  
merged clusters if Access Ratios of the additional merged clusters conform to the  
predetermined threshold.

13. A system for grouping one or more interested objects in a directory  
system based on their corresponding accesses patterns with regard to other objects, the  
access pattern of an interested object being defined by other objects which the interested  
object has accessed or by which the interested object has been accessed, the system  
comprising means for:

putting each interested object in a singleton cluster, the singleton cluster having  
only one such object member; and

merging first and second singleton clusters into a third cluster if a ratio between  
an access pattern in terms of objects associated with each of the first and second  
singleton clusters and a combined access pattern associated with the third cluster (the  
"Access Ratio") conforms to a predetermined threshold,

wherein the step of merging is repeated until no more clusters can be merged.

14. The system of claim 13 further comprising means for modifying each  
cluster, after no more clusters can be merged, if at least one of its objects' access  
activities has changed the corresponding access pattern associated with the object such  
that the Access Ratio associated with the cluster does not conform to the predetermined  
threshold.

15. The system of claim 13 further comprising means for:  
removing the object causing the non-conformance of the predetermined  
threshold from its cluster into a fourth singleton cluster; and  
merging the fourth singleton cluster with other clusters to form additional  
merged clusters if Access Ratios of the additional merged clusters conform to the  
predetermined threshold.

16. The system of claim 13 further comprising a working set containing one or  
more other objects representing the access pattern of the interested object.

17. The system of claim 16 wherein the working set contains a predetermined  
number of other objects most recently accessed by or having accessed the interested  
object, which are not redundant among themselves.

18. The system of claim 13 further comprising an access list of each cluster  
after all the mergers have been done containing all objects being accessed by the objects  
in the cluster or objects having accessed the objects in the cluster.

19. The system of claim 13 further comprising an association list of each  
cluster containing one or more clusters that share one or more objects therewith.